DOCUMENT RESUME

ED 444 569 IR 020 225

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TITLE	Effective Means of Integrating Technology into the School of Education.
PUB DATE	2000-00-00
NOTE	8p.; In: Society for Information Technology & Teacher Education International Conference: Proceedings of SITE 2000 (11th, San Diego, California, February 8-12, 2000). Volumes 1-3; see IR 020 112.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Computer Uses in Education; *Curriculum Development; *Educational Change; *Educational Planning; *Educational Technology; Higher Education; Teacher Education
IDENTIFIERS	College of New Jersey; *Technology Integration; *Technology Plans; Technology Utilization; Vision Statements

ABSTRACT

This paper discusses various issues that challenge technology restructuring efforts and presents a working plan to minimize resistance and maximize faculty performance and student accomplishment at the School of Education of the College of New Jersey. The first section discusses obstacles to infusing technology in teacher education programs and summarizes the process of developing the plan to restructure teacher education programs with computer technology integration. The second section summarizes the current reality of technology needs of teacher educators, inservice and preservice teachers' technological skills, and technology implementation in student teaching is summarized. The third section presents vision statements for the restructuring effort. The following four initiatives of the working plan are described in the fourth section: restructuring computer courses; producing student leaders/educational computer experts; extending computer technology into lifelong teaching and learning; and computing for a global community. Expected outcomes of the initiatives are listed in the fifth section. The sixth section addresses two related issues: designing computer courses to help students accomplish more and focusing more on students rather than faculty. (Contains 10 references.) (MES)

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ED 444 569

Effective Means of Integrating Technology into the School of Education

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Abstract: Technology integration in teacher preparation is indispensable. Various efforts and approaches were taken in the past two decades; however, the results were not satisfactory. This paper addresses many obstacles that challenge the reform effort. To overcome obstacles and maximize the efforts of technology integration, this paper presents a new working plan to address various issues and different aspects of technology integration. The plan can be highlighted by students leading technology efforts and technology course development.

In search of a working plan

Although educational technology has been around for more than two decades, the results of technology integration in the schools are far from satisfactory. Many people accuse the higher education teacher preparation institutions for not doing a good job to adequately prepare teachers to use technology in teaching and learning. In fact, various approaches were taken to integrate technology in many teacher preparation programs (Brehm, et al., 1997; Handler & Strudler, 1997; Kahn, 1997). When higher education teacher preparation institutions strove to infuse technology in the degree programs, many efforts were seriously challenged by some undesirable obstacles, including, (a) insufficient funds to support the needs and resources for the integration of technology, (b) teacher education faculty being out of touch with the reality in the public schools, (c) inadequate staff development and time allocation to support the use of emerging technology in teacher education courses, (d) strong resistance from some faculty members who do not buy into technology or who are reluctant to participate, and (e) inadequate plans excluding preservice or inservice teachers, students, and local community.

Sheingold (1991) stated, "The successful transformation of student learning in the nineties will require the bringing together of three agenda of reform: an emerging consensus about learning and teaching, a movement toward well-integrated uses of technology, and the push for restructuring. Each agenda alone presents possibilities for a very powerful redesign of education. Yet none has realized -- or is likely to realize --its full potential in the absence of the other two." A well-designed restructuring plan, supported with the three agenda of reform, becomes indispensable to address the concerns mentioned above.

At the School of Education at the College of New Jersey, based on the guidelines of a developed conceptual framework, an initiative was taken to develop a working plan to restructure the teacher education programs with computer technology integration. First we examined the reality about the current practice in the schools as well as what has been

IR020225

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going on in teacher preparation institutions. We then examined the traditional restructure plan that focuses on faculty development and identified factors that hindered successful technology implementation. A revised plan, centered on the well-conceived conceptual framework, was established. This revised plan, intended to minimize the faculty's resistance to integrating computers and to help include all that are concerned, shifts the focus from the faculty to students. A group of student experts of educational technology, after they received sufficient training, became the task force and took leadership in this effort. To address the needs of use and to get everyone involved in the restructuring process, this working plan can be characterized by (a) the honor students-based peer mentoring and support system; (b) cooperation and collaboration between the students, faculty, information management team, school teachers, community, and industry; and (c) computer course revision. This paper discusses procedures of implementation for various stages and address other related issues.

Reality check

The Office of Technology Assessment [OTA, 1995] reports that the number of school computers has been significantly increased and the ratio between computers and students has been positively improved. However, computer use in the school has not been adequately implemented. Teachers are not yet ready to use technology in their teaching. Neither are many university professors ready to implement technology. In reality, computer technology integration universally faces a series of challenges. The following are a few examples. Dias (1999) pointed out that the most common barriers to technology integration include time, training, resources, and support. Also according to Dias (1999), most teachers or teacher educators do not know how to integrate technology into curriculum. Zehr (1999) indicated that educators have a lot of digital content to choose from, but much less is worth using in the classroom. To decide where we are going, we need to know exactly where we are and a survey of reality is essential to our effort.

- *Technology needs for the teacher educators.*

From a recent faculty survey, we learned that most teacher education faculty members agreed to the importance of computer technology in teacher education as well as technology integration in the curricula. However, we also learned that most faculty members were in need of help with their own technology needs. Some of them requested assistance in catching up with the emerging technology, others demanded good specific examples of practice in computer integration in curricula.

- *Inservice and preservice teachers' technological skills.*

In a recent computer literacy survey of preservice and inservice students in a required Microcomputer for Educators course, we found almost all students have access to computers. Their primary computer experiences are mainly surfing the Web, sending e-mail, and typing papers for term reports. Taking a further look at their technological skills, we were surprised to know that most students do not possess adequate skills or knowledge about the current computer applications for curriculum integration.

- *Observation of the technology implementation in student teaching.*

Clinical experience is a clear indicator to show how technology is integrated into curricula as well as how public schools have been affected by the teacher preparation programs. With many visits to the classrooms where our student teachers were gaining their first-hand classroom experience, we were surprised to see only minimum of computer integration in the curricula. Oftentimes, students were sent to the computer lab with the computer coordinators. The computer tasks they were learning were mostly irrelevant to the learning contents covered in the classroom. In addition, teachers were absent in this exercise. With the tight schedule and many prearranged activities, as well as many other obstacles, our student teachers did not get many opportunities to use computers.

Vision statements

To develop a consensus of the directions in which we should move and to provide a clear picture of what goals we want to be at the end of the restructuring effort, the following vision statements promote the intended outcomes of the effort.

- All students should possess basic computer literacy skills before they start taking regular computer courses.
- All faculty members are equipped with needed computer resources and skills in developing an exemplary practice of integrating computers into their own curricula.
- Students are learning in a technology-rich environment and will naturally be able to integrate computers into their future teaching and learning.
- Our student teachers are able to make an impact in the school where they are receiving their clinical experience. They will become proud of what technological skills they have and the kinds of services they provide.
- The School of Education at The College of New Jersey will be able to take leadership in providing services to the global community by extending our computer integration efforts throughout various projects, cooperations, and collaborations with the local community and national or international partners.

Initiatives

To attain the goals of the technology integration, a plan with proactive efforts was made containing the following four initiatives.

a. Computer course restructuring. The first initiative is to improve the technological skills of the teacher education faculty and students. This initiative involves the acquisition of technological resources and development of computer literacy skills in which students may explore the integration of technology into instruction. All teacher education students must demonstrate competence in the design, development, selection, utilization, management, and evaluation of processes and resources for learning. Teacher education students must also be able to seamlessly integrate technology as a tool for enhancing the teaching/learning process. To attain these goals, a series of computer courses is offered to ensure students' basic computer literacy skills and the continuity of

applications of computer skills in future teaching and learning. Courses are revised to address students' needs as well as to meet the NCATE standards. A computer literacy test will be administered to demand that all students start their teacher education program with necessary computer literacy skills. A general computer literacy course where students can acquire all needed computer skills to become productive and efficient will be required. Further on, some extensive computer courses will be offered to address the issues of technology integration in content teaching throughout the junior professional experiences and student teaching. These courses are designed and conducted with various devices to help students accomplish the most in the learning components (Pan, 1999). At the end of the teacher preparation program, an electronic portfolio assessment is recommended for all students in the School of Education.

b. Student leaders/educational computing experts. This initiative is to create a technology-rich environment by providing needed technological resources and technical support to users. The College of New Jersey campus has more than 20 computer labs for various purposes. More than 75 percent of new students come to campus with their own computers. The campus network has reached every classroom and dormitory. To take advantage of the existing resources and to maximize the power of computers for integration, this initiative aims at producing computer experts all over the campus. The campus Information Management team, who used to provide assistance and services to faculty members, will join the force to help train the students as well. Students, who are proficient in computer skills, will be identified and assigned to provide leadership and services to others. These students will be offered scholarships or assistantships while they are studying and working as honored consultants. The leading technology experts will be assigned all over the campus, helping the faculty and other students teach, learn, and solve problems.

c. Extend computer technology into lifelong teaching and learning. This initiative aims at getting all faculty members and students involved. Faculty members are invited to work on technology-based projects with students. As many faculty members indicated in the survey, they are interested in working on technology-related projects as well as in integrating technology into their curricula. Many faculty members also candidly expressed their concerns about low computer skills. They hoped to see some examples of successful integration of technology, and they definitely needed help with their technology work. In reality, integrating computer technology may mean different things to different people. Taking students to the computer lab once a week for 40 minutes is not necessarily integration. Morton (1996) suggested that technology is integrated when it is used to support and extend curriculum objectives and to engage students in meaningful learning. Technology should not be treated as a separate skill, instead, technology should be an integral part of life in teaching, learning, and problem-solving.

d. Computing for a global community. This initiative intends to extend leadership and provide services to the global community by extending computer integration efforts throughout various projects, cooperations, and collaborations with the local community and national or international partners. To extend the influence of the technology reform to the public schools, we ought to send the best student teachers to work with cooperating

teachers. The school teachers stay informed of the best practices and in turn make modifications in their own teaching and restructure their own curricula. We also need to extend efforts in seeking external funding and grant opportunities, with which we will be able to keep up with the newest development of technology and develop a close tie with outside businesses and industry who may also have input about the future trend of educational development.

Expected outcomes of the initiatives

Goal 1: reaching consensus among faculty members regarding college technology reform
Goal 2: restructuring course work
Goal 3: identifying student experts and assigning student leaders to work with the faculty
Goal 4: getting the faculty interested and involved
Goal 5: engaging collaborative projects between the faculty, students, and other classes
Goal 6: writing grants for extended services
Goal 7: reaching out to community, schools, and local business

Issues

- *Design computer courses to help students accomplish better.*

Some universities require students to take a basic computer literacy course where they learn about different applications, create web pages, make presentations, and generate multimedia materials for instructional needs. Levin and Buell (1999) pointed out some potential problems in this approach. The course may become a one-time course that fulfills a degree requirement and has no relevancy to other courses. Students may postpone the course until the end of their certification program, or they may quickly forget how to use technology because there is no continuity in their learning. An alternative approach is to integrate technology into each course without a prior computer foundation course (Levin & Buell, 1999; Waugh; 1998; & Zola & Armbruster, 1995).

Simply requiring professors to integrate technology into their curricula or assigning technology-based tasks will present problems. Most students do not possess needed technological skills to do the tasks, so they either will require the professor to teach them or they will have to spend extra time learning on their own. In either case, the focus of the learning contents has shifted to more learning about technology, and the class may become inefficient. For example, a professor asks his or her students to produce a web page for their final project. Students who have no knowledge of or experience with web page construction will be puzzled and frustrated. This is likely to result in more complaints from students and incur faculty resistance.

To provide a better solution to the problem, we believe computer literacy skills for students are essential to the success of technology advancement and integration in teaching and learning. Basic computer courses are important to attain this goal; however,

it is also important to develop a plan to extend computer skills to other areas of course work, term projects, and various kinds of collaborations.

- *Focus more on students rather than the faculty.*

In examining why many higher education technology plans didn't work, we could easily pinpoint resistance from the faculty. Integrating technology requires tremendous amount of time and effort from individual faculty; however, there are not enough incentives to motivate every faculty member to participate in such a practice. In addition, there is inadequate technological support and training and meager resources. To infuse technology in curricula, we must get faculty members involved. To break the isolation and resistance from faculty members, we shifted the focus from the faculty to students. We invited faculty members to work on technological tasks with students or to assign technological tasks to students. For example, a group of students from the computer literacy class were assigned to work with faculty members to design and develop the faculty's personal and class Web pages. Many faculty members became excited about this project. They became involved and gradually became aware of the procedures of setting up their own Web pages. Eventually these faculty members realized the convenience and importance of their Web pages and integrate the Web into their work and teaching. Other faculty members accidentally found out that their students were making presentations with ClarisWorks and PowerPoint programs in the computer literacy classes and were impressed by the quality of the results. They started asking students to make electronic presentations as a course requirement.

When the focus was placed on students, the resistance from the faculty will be minimized. Students can work with faculty members for various projects and challenges. They can learn quickly about technology as a tool and apply their computer skills in the other content learning. In a simple manner, faculty members can easily assign technology-related tasks. Faculty do not need to have high technology expertise to know every aspect of computing, but students are expected to perform with the best effort using skills and knowledge they have acquired from what computer experience they had from previous basic computer literacy courses. Most faculty members will find technology integration a good move instead of a burden.

Summary

In recent years, there has been growing recognition of the need to restructure teacher preparation programs to support efforts of improving education, among which technology integration into curriculum is one of the most important. To successfully integrate technology into curricula and to develop exemplary practice for public education, we will have to face many challenges. This paper discussed various issues that challenge the technology restructuring efforts and described a working plan to minimize the resistance and maximize faculty performance and student accomplishment.

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